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European Patent Office

Office européen des brevets

(1) Publication number:

0 080 126
A1

(2)

EUROPEAN PATENT APPLICATION

(21) Application number: 82110434.6

(51) Int. Cl.: B 65 D 88/16

(22) Date of filing: 11.11.82

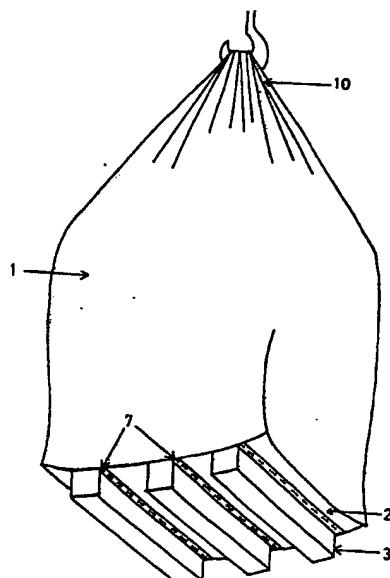
(37) Priority: 24.11.81 NO 913981

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(54) Flexible container and method for its production, and its application.

(55) The present invention relates to flexible containers (1) having at least one lifting loop (10), and a central part and a bottom (2). It also comprises manufacture and application of such containers. During lifting and transport lifting forks can be applied which are placed in or between devices in the container's bottom, and this results in a minimum lifting height which is important during loading of such containers into closed containers. The devices result from the fact that the container's bottom is equipped with pockets (7) for placement of hollow or compact battens (3) or spacing blocks which can be hollow or compact and which preferably are fastened to a plate (4). The container itself is manufactured in a conventional way, then pockets (7) are fastened to the bottom (2) and battens (3) are placed in these. The manufacture can also be carried out by fastening battens (3) or spacing blocks (11), which preferably are on a plate (4), to the bottom (2) of a conventional flexible container (1) by gluing or in other suitable ways.

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The present invention relates to flexible containers comprising at least one lifting loop, a central part and a bottom which can consist of one or several layers of flexible material, and which possibly can be equipped with emptying means or a tapping spout. The container can be equipped with an inner liner of impervious material, e.g. of polyethylene or a similar material.

The invention also comprises a method for manufacture of the flexible container, comprising manufacture of the container itself which has at least one lifting loop and a bottom, which can be an integral part of the container itself. The invention also comprises application of the container.

Such flexible containers, which are also called intermediate bulk containers, have found increasing application for transport and storage of several types of material, both free-flowing and lump-formed material. The containers have also been used for transporting small size bags.

Several types of such containers are known. One main type has integral lifting loops and are described in US patent No. 4,136,723. The container described in the patent has a double bottom made by joining together direct extensions of the container's walls. It is thereby formed two bottom loops which intersect. Such flexible containers are available in different sizes, usually meant for about 600 kg and up to several tons of material, and having a volume of for instance 600 l to several m^3 . The construction and choice of construction material are to some degree adjusted in view of the type of material which are to be transported and/or stored. Thus some types of food-

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stuff require special arrangements in order to avoid that the material is damaged during transport and discharge of the container.

When the flexible container is filled with free-flowing or lump-formed material, it is closed and made ready for further transport. The lifting loops are placed on a hook, a lifting arm or a fork connected to some transport means. Quite often it might be practical to transport the containers to an intermediate storage. There the containers will be stacked upon each other so that the height of the storage will be equal to the height of several containers. The containers will remain at this storage for some time before they are transported to the customer. Accordingly, it might be necessary to lift and transport the container several times before it is emptied. Usually the container will, also during the discharge operation itself, be lifted so that it can be emptied through its bottom, either through a discharge spout or a hole made in the container. Because of all these lifting and transport operations between filling and discharge of the container, it is important that the lifting loops are strong and have a design which makes it possible to apply conventional means like cranes, lifting arms or fork trucks etc.

It is often desirable that the transport of the flexible containers from the filling station to the customer is carried out in closed containers which can be transported by trucks, railroad, boats or aeroplane. For sensitive materials like for instance food-stuff, such a method of transportation is indeed of interest. Closed containers are chosen in order to reduce the risk of loss by theft or damage of the packaging. Since the transport of flexible containers in closed containers has become more important, have new demands for effective loading and unloading of the containers been stated. It has then been found that it is rather complicated to transport flexible containers in and out of the closed container. The container's lifting loops, which are quite practical for other purposes, turn out to be impractical for fast transport of the flexible container in and out of the closed container. The lifting height will usually

be too high and it is difficult to convey a container into a deep closed container. Stacking in such closed containers is almost impossible, and when a container shall be unloaded it can be difficult to hook the lifting loop on to the lifting means.

There exist other cases too, in which it is desired to have other lifting possibilities than the known ones. Today it is therefore quite often necessary to apply special lifting arms or adapters which must be connected to the transport means. Also here one wishes to be able to apply standard equipment.

There have been made several attempts to overcome these problems, for instance by making special types of lifting loops so that the lifting height will be almost the same as the height of the filled container. Such a construction is described in GB Patent Application No. 813225. This construction is quite suitable for some purposes, but the demand for new solutions to the problem is still great.

The main object of the present invention was to arrive at a type of flexible containers which could easily be loaded and unloaded in and out of closed containers, preferably by using conventional lifting and transporting means. Another object was to construct and produce such containers without amending too much on the basic construction, so that positive properties of proven flexible containers could be attained.

During their efforts to solve this problem, the inventors first equipped the flexible container with extra lifting loops arranged at the side of the container itself. By forming the loops like pockets fastened approximately at the middle of the container, it would be possible to put the forks into these loops and lift the container during loading and unloading. The best results were obtained when these extra lifting loops were braced. However, this solution turned out to have its limitations. It was for instance difficult to obtain a distance between the lifting loops which corresponded to the distance between the forks on standard fork lifts.

As modification of the lifting loops only seemed to partly solve the problem, the inventors decided to attack the problem from another angle, namely by trying to find practical ways of lifting the container itself by means of a fork lift. It was known to use fork lifts having special clamping devices which could be pressed around the filled container. Such devices have not proved to be especially practical during loading of closed containers. However, it would be an advantage if it was possible to apply standard fork lifts, as these have become quite common and are used in most stores and harbours. The inventors also found that if they could at least hoist the flexible container somewhat from the plane on which it was standing, a pair of forks could be placed under the container and then it could be lifted and transported without applying the usual lifting loops. During further development of this idea it was found that battens or spacing blocks could be arranged in the bottom of the container. These devices would make it possible for fork-formed lifting devices to grip or get support. The battens or spacing blocks could be fastened permanently to the container's bottom or they could form part of a unit which could be fastened to the container and detached from it according to requirement. The battens could be hollow or compact with different cross-sections, preferably circular or rectangular. Here the grip bracket indicates that a fork pinnacle is in engagement with the battens or spacing blocks when these are hollow and the pinnacle is placed in the hollow space.

During the manufacture of such containers it was found advantageous to split the manufacture in two steps, one at the production site for the container and one just before or after filling the container with the material which is to be transported in it. At the production site the container could for instance be equipped with pockets in the bottom. At the filling station hollow or compact battens would be placed in these pockets and thereby one would obtain a flexible container which could be lifted by a fork placed under the container's bottom or through hollow battens or spacing blocks arranged in the container's bottom. At the same time one would obtain ordinary lifting loops for application when that was suitable.

The battens could also be glued to the container's bottom or be connected to a plate which was fastened to the container's bottom by straps, or by melt gluing. This operation should preferably be carried out at the site where the container was filled with material.

The battens could be of any suitable material like plastic, cardboard, wood or metal. When hollow battens are used, plastic pipes or plastic profiles are usually the most suitable materials. Also when the battens or spacing blocks together with a plate form a unit, for instance in the form of a pallet, plastic will be the most suitable material, but wood and cardboard can be applied as well.

The scope of the invention and the special features of it are as defined in the following claims.

The flexible container and its manufacture will be further explained during the description of Figs. 1-5.

Fig. 1 shows a flexible container with battens in the bottom.

Fig. 2 shows a unit with battens which can be fastened to a flexible container.

Fig. 3 shows a flexible container with pockets for battens.

Fig. 4 shows a flexible container with a double bottom and with battens.

Fig. 5 shows a flexible container having two pockets.

Fig. 6 shows a unit with spacing blocks which can be fastened to a flexible container.

In Fig. 1 is shown a flexible container 1 with lifting loops 10 and a bottom 2. To the bottom 2 are fastened battens 3 which can be placed in pockets 7 that are fastened to the bottom 2 by sewing or in other ways.

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Fig. 2 shows a plate 4 to which are fastened hollow or compact battens 3. The plate 4 can be equipped with openings 5 through which the container's discharge spout is conducted. The opening 5 also makes it possible to cut a hole in the bottom 2 of the container 1 in order to empty it. When the plate 4 is equipped with an opening 5, the batten 3 in the middle of the figure might be cut away right under the opening 5. During manufacture of the container according to the invention, the plate 4 is fastened to the bottom 2, preferably with some kind of gluing. This operation can be carried out just before or after the container has been filled. The plate 4 can also be fastened to the bottom 2 by means of straps, and these can be conducted through the container 1 just above the bottom 2 before the container is filled. The container and the batten can thereby be transported separately, and a method of making the container itself is attained regardless of whether it is equipped with the batten unit or not. On which step in the process the plate 4 should be connected to the container, will depend on several factors and have to be chosen in each case.

Fig. 3 shows a flexible container 1 with pockets 7 fastened to the bottom 2 by seams 6. Before the container 1 is filled the battens 3 are placed in the hollow spaces 8. Such a container can of course be used without battens if that is desired. If the battens 3 are placed in the pockets 7 on the filling station, will the empty, folded container from a transportation point of view not have a larger volume than a container without pockets. The number of pockets 7 can be varied, but should be at least one. If only one pocket is used, it has to be wide so that the batten in it supports both forks. The pockets 7 can also be fastened to the upper side of the bottom 2, but then they have to go all the way through.

Fig. 4 shows a flexible container having a double bottom comprising two bottom loops 2, 2', and between these are placed two battens 3, with hollow spaces 8, and can be a plastic pipe or the like. The battens 3 are placed in between the bottom loops 2, 2' at the outer edges of the container's bottom just before it is filled with material. Said material will press the

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bottom loop 2' against the battens 3 and form loops 7. The weight of the material will keep the battens in desired position.

Fig. 5 shows a flexible container 1 where the pockets 7 are fastened at the outer edges of the bottom 2.

Fig. 6 shows a plate 4 to which is fastened several spacing blocks 11 which can be hollow or compact. The blocks 11 are placed such that they form at least two rows which can give grip brackets or support for lifting forks. The plate 4 can also be equipped with an opening 5 which makes it possible to empty the container. The plate 4 can be fastened to the container as described in connection with Fig. 2.

When hollow battens or spacing blocks are used, the lifting forks are placed in the hollow spaces or between the battens themselves or the rows of spacing blocks during the lifting process.

The present invention has produced a flexible container which has the advantages of known containers, but it does not have their greatest disadvantages, i.e the large lifting height attained when only conventional lifting loops are used. The problem of loading and unloading flexible containers in and out of closed containers has by this new container found a simple and rational solution.

The container according to the invention can be produced at almost the same price and with substantially the same equipment as known containers. This is especially the case when it is made with pockets sewn on to it. Placement of the battens in the pockets can be carried out where the container is filled, and there is no need for special equipment for this.

When battens or spacing blocks, preferably fastened to a plate, are used, the container according to the invention can be made by fastening these to a conventional flexible container. Also this part of the manufacture can be carried out at the site where the container is filled with material.

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The applicability of flexible containers have by this invention been substantially expanded without large investments in new production equipment and without changing the basic construction of the container itself. Despite of this a flexible container has been made which can be handled easily by conventional fork lifts. Lifting of the new flexible container also requires an absolute minimum of lifting height, and the container can be stacked at least as well as known containers.

Claims

1. Flexible container (1) comprising at least one lifting loop (10), and a central part and a bottom (2) which can consist of one or several layers of flexible material and which can be equipped with discharge means, and where the container possibly is equipped with an inner liner of impervious material,
characterized in that
the bottom (2) is equipped with pockets (7) which can be braced and which form openings (8) for placement of hollow or compact battens (3) or that hollow or compact battens (3) or spacing blocks (11) are arranged at the bottom (2), preferably fastened to a plate (4), that the plate (4) is permanently or disengageably fastened to the bottom (2) and that the battens (3) or spacing blocks (11) are arranged such that they give grip brackets or support for fork-formed lifting devices.
2. Flexible container according to claim 1,
characterized in that
a plate (4) with battens (3) or spacing blocks (11) is fastened to the bottom (2) and where at least the plate (4) is of a material which can be glued to the bottom (2) and where there is an opening (5) in the plate (4) between the battens (3) or spacing blocks (11) for placement of a discharge device or makes it possible to cut a hole in the bottom (2) for emptying of the container.

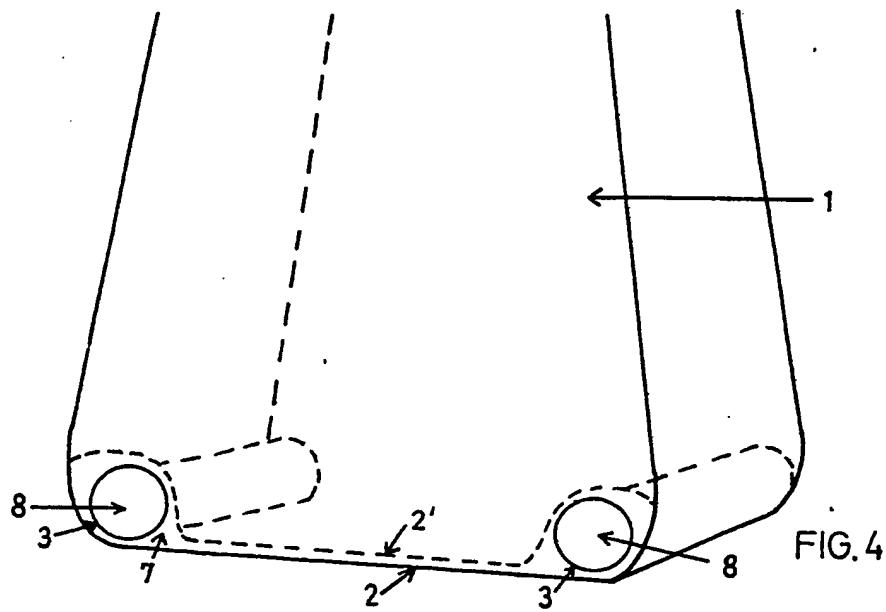
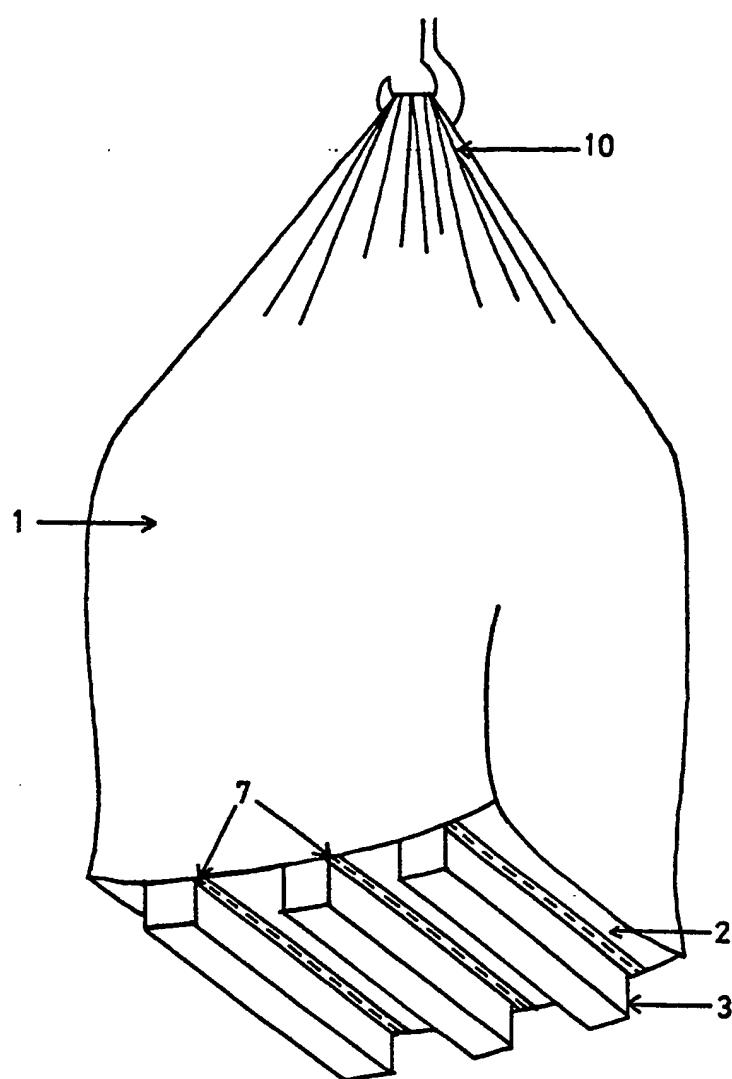
3. Flexible container according to claim 1,
characterized in that
the pockets (7) are formed by using a container (1)
having a double bottom (2, 2') and that the two hollow
battens (3) are placed between the bottoms (2, 2') at a
distance from each other.
4. Method of manufacturing flexible containers according to
claims 1-3, comprising manufacture of the container
itself with at least one lifting loop and a bottom,
which can be an integral part of the container itself,
characterized in that
at the container's bottom there is arranged at least one
hollow or compact batten having a maximum length corres-
ponding to the container's cross-section or that under
the bottom is fastened at least two sets of hollow or
compact spacing blocks such that the battens and/or
spacing blocks can give grip brackets or support for
fork-formed lifting devices.
5. Method according to claim 4,
characterized in that
the battens are surrounded by flexible material in form
of separate pockets fastened to the container's bottom
or pockets formed by equipping the container with a
double bottom.
6. Method according to claim 4,
characterized in that
the battens or spacing blocks are fastened by gluing or
in other ways directly to the container's bottom.
7. Method according to claim 4,
characterized in that
the spacing blocks or battens are arranged on a plate
for forming a unit which is fastened to the container's
bottom by gluing or by means of straps.

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8. Application of flexible containers according to claims 1-3 for transport and storage of bulk material which during its handling has to be lifted or transported by fork-formed lifting devices which can be placed in or between battens or spacing blocks fastened to the container's bottom during lifting of the container, which also can be lifted by lifting loops in its upper part.

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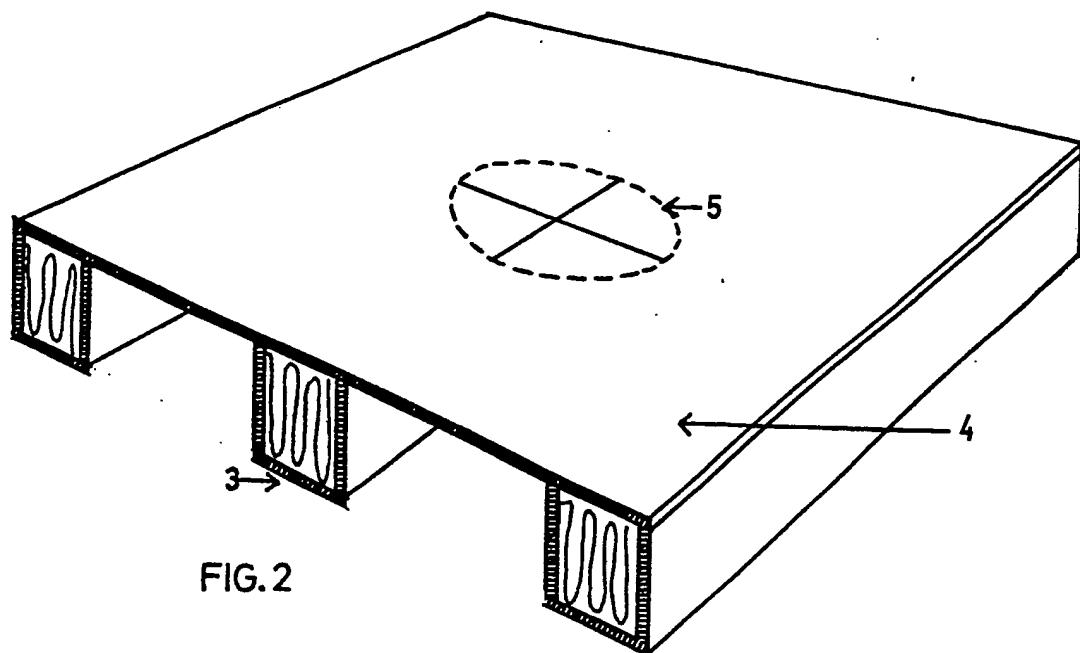


FIG. 2

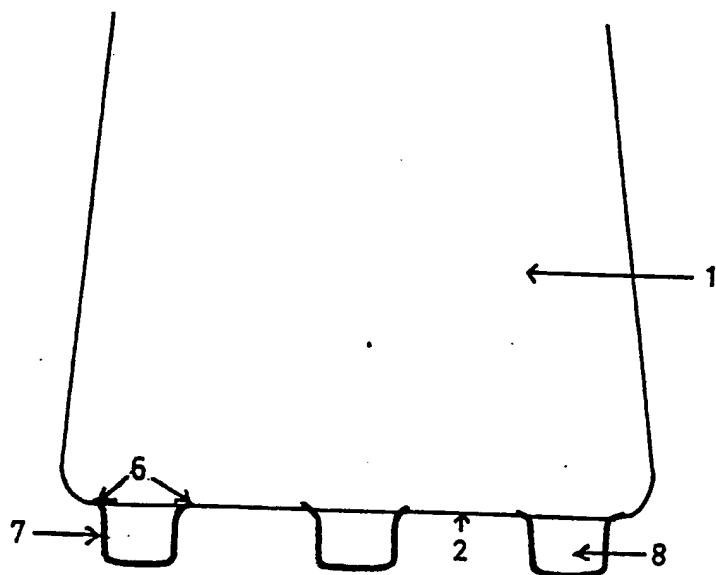


FIG.3

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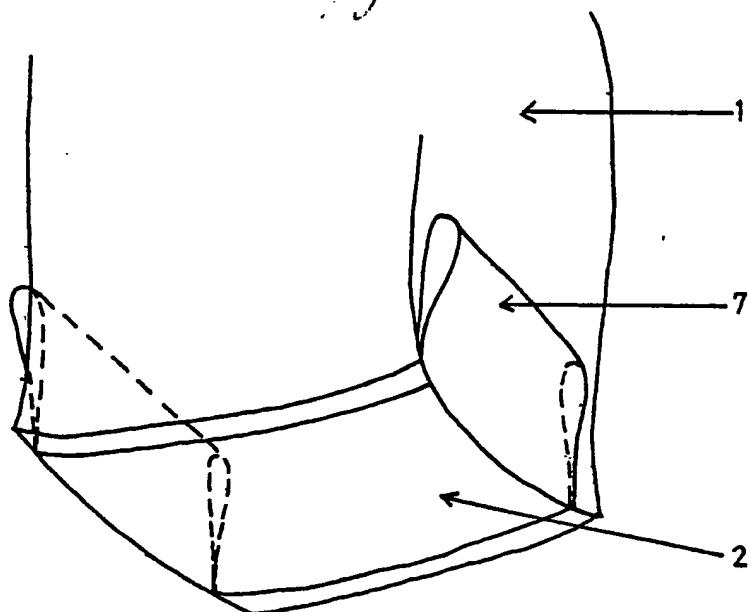


FIG.5

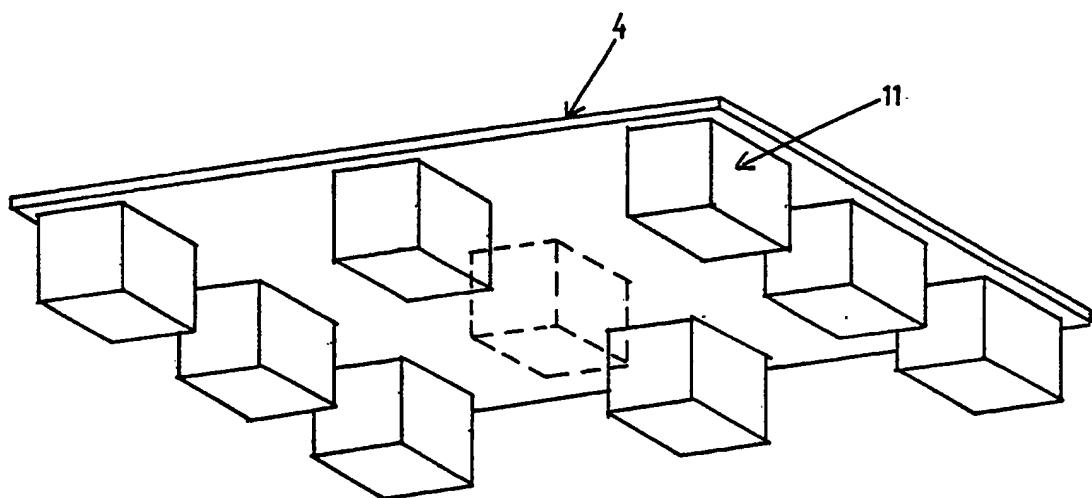


FIG.6



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EUROPEAN SEARCH REPORT

0080126
Application number

EP 82 11 0434

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. *)
X	---		B 65 D 88/16
X	FR-A-2 175 600 (STALARS) *Page 3, lines 2-35; page 2, lines 2-5; figures 1,2*	1,2,4, 5,6,7, 8	
X	--- DE-A-1 816 627 (WETZEL) *Page 4, lines 9-25; figure 2*	1,3,4, 8	
X	--- FR-A-2 165 324 (RATHOUISS) *Page 2, lines 25-36; page 3, lines 1-9; figures 1,2*	1,2,4, 8	
A	--- DE-A-2 031 634 (SVENSKA SILIKA) *Page 2, lines 23-32* -----	1	TECHNICAL FIELDS SEARCHED (Int. Cl. *)
			B 65 D
<p>The present search report has been drawn up for all claims</p>			
Place of search THE HAGUE	Date of completion of the search 01-03-1983	Examiner OSTYN T.J.M.	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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